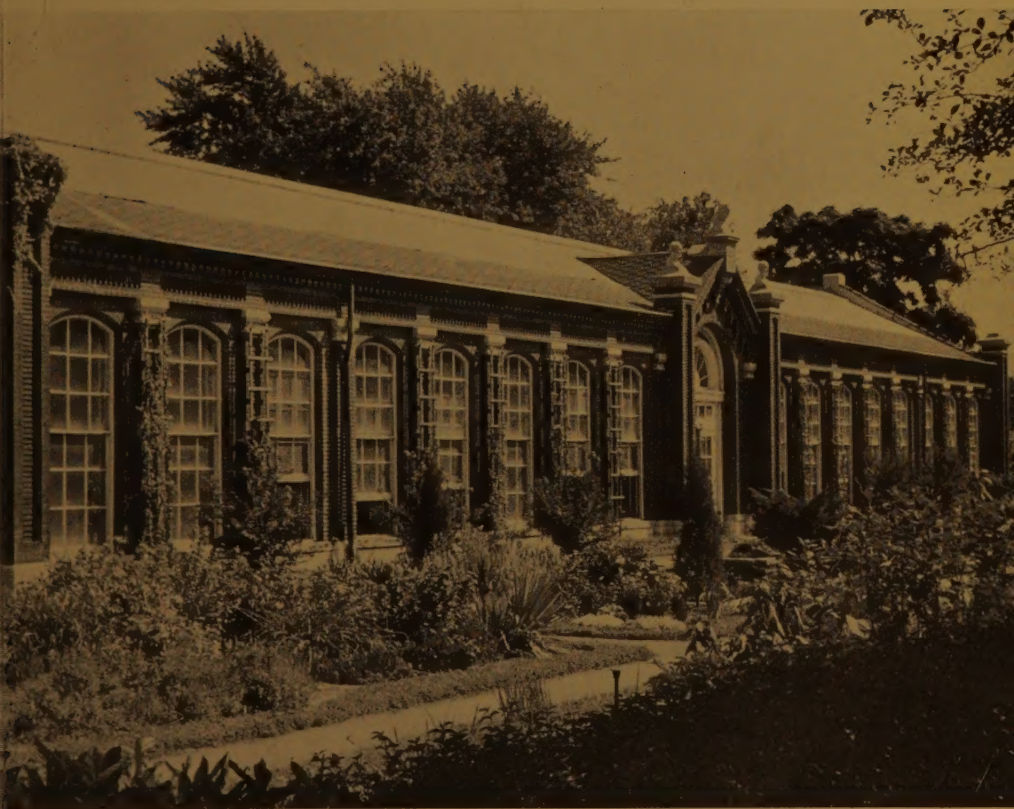


MISSOURI BOTANICAL GARDEN BULLETIN



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COVER: Linnean House in the fall. Photograph by Martin Lammert III.

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THE LINNEAN HOUSE

THE Linnean House was built by Henry Shaw in 1881 and 1882 to house the palm collections and part of the floral displays. This is the only greenhouse remaining which was built and used by Mr. Shaw; and, although it has had many repairs over the years, the house is not greatly different from what it was in 1882. Receipts and ledger entries in the Garden's collection of Mr. Shaw's papers show that most of the work on this greenhouse was completed in 1881. By the summer of 1882 it was being used for plants; but it was not until June 22, 1883, that the marble busts of Linnaeus, Thomas Nuttall, and Asa Gray were unveiled and dedicated before members and guests of the American Association of Nurserymen, Florists and Seedsmen, then holding its annual convention in St. Louis. For many years this was the principal plant house in the Garden. Mr. Shaw must have planned to place other figures or ornamental features on the corners of the building and on the highest points of the ends, for into the centers of the stones at these points are cut holes for anchoring figures or ornaments. It is

possible that vases or rounded stones similar to those used on so many buildings, walls, and posts throughout the Garden actually were installed, but so far no pictures have been found which show these in place and there are no receipts or entries in ledgers which refer to an additional six ornaments.

This summer the north half of the roof of the Linnean House was removed, all the wood sheathing replaced with redwood and treated lumber, the framework cleaned, treated and painted, new flashing and roofing applied, and glass installed. This was done with funds raised by the Garden Club of St. Louis during their Spring Garden Tour. It is hoped that next year this work will be continued and the decayed windows and frames replaced.

Usually the greatest splash of color can be found in the Linnean House in February when the camellias are in flower; but this year there will be an added show. Throughout November bright chrysanthemums will stand out in sharp contrast to the dark green leaves of the ivy, camellia, and the creeping fig which covers the north wall.

—H. C. C.

IN MEMORIAM BENJAMIN MINGE DUGGAR

WORD has been received from the Lederle laboratories at Pearl River, New York, of the death of Dr. B. M. Duggar on September 10, at the age of 84, after a very short illness. Dr. Duggar is remembered at the Garden as the Plant Physiologist, in charge of the Graduate Laboratory of the Henry Shaw School of Botany from 1913 to 1927. He was an inspiring teacher and during his headship the School of Botany attained the prestige for which it has since been noted. Among the botanists who received their doctor's degrees under his tutelage at the Garden were: A. R. Davis, Henry Schmitz, J. Warren Severy, L. J. Klotz, R. A. Studhalter, Robert W. Webb, George M. Armstrong, Joanne Karrer Armstrong, S. M. Zeller, Takahashi Matsumoto, A. F. Camp, W. H. Chambers, G. W. Freiberg, P. L. Gainey, Grace Howard, D. C. Neal, Emery R. Ranker, Fanny Fern Smith Davis, H. C. Young.

In 1927 Dr. Duggar left St. Louis for the University of Wisconsin where a special Research Professorship had been created for him. In 1943 when he reached the retiring age he went on to the Lederle Laboratories where he played a leading role in the commercial development of the "wonder drug" aureomycin.

Dr. Duggar was a talented, many-sided person and during his long professional career he achieved distinction in more than one special field. He was intensely interested in the teaching not only of advanced students but of ele-

mentary botany classes and was author or co-author of various textbooks. As a young man he pioneered in the scientific breeding of mushrooms and as a kind of hobby wrote the standard book on mushroom growing. While at the Garden he developed and maintained a small business devoted to producing and selling high-grade mushroom spawn. Old-timers at the Garden remember this enterprise with affection because to produce mushroom spawn effectively one has to raise a lot of mushrooms. Dr. Duggar was not in the business of selling mushrooms and, since he was a most generous man, during those years every one from the janitor to the director enjoyed the surplus crop.

Though at the time it looked like a by-path, this experience stood Dr. Duggar in good stead when late in life he turned to the commercial production of antibiotics and was faced with the problem of growing various fungi in enormous quantities and as cheaply as possible.

Dr. Duggar and his family were active in the social life of the city and were widely known, yet in his day it was difficult to explain to the public just what he and his students were up to. The mushroom spawn business was understandable but that was just a sideline. With his students he was busy studying the physiology of fungi. Moulds, rots, mildews, rusts (and many a fungus so anonymous to the general public that one can find no common name to tag it with) were

grown in flasks and bottles. Their diet was scientifically regulated. Precise determinations were made of just what chemical substances they would feed on; and what they turned this food into was determined in so far as possible. Fungi are remarkable chemists; Dr. Duggar and his students took the lead in establishing that fact. Yet in those days it was almost impossible to make his various non-scientific friends understand that he was not just trying to learn how to prevent mildew or kill rusts or save man and his crops from the attacks of various micro-organisms. What he and his students were doing was basic research; they were trying to understand precisely how these organisms lived. Out of this effort have come such things as antibiotics and the various industrial uses of fungi; but even these advances are only by-products of the central effort he was making.

It is significant that even the august

NEW YORK TIMES, which devoted two eight-inch columns to his obituary, never even mentioned what is probably his most important scientific work, his pioneer studies of virus. Are viruses disease germs or are they just a chemical substance? Dr. Duggar took the lead in establishing with precision something about their exact size and suggested that they were like an hereditary particle (a gene, perhaps) which had gone off on a career of its own. He was, you see, in his work with viruses, making a direct attack on the study of life itself, a study in which the Henry Shaw School of Botany is still playing a leading role. The farther a man is ahead of his fellows, the less are his efforts appreciated and understood. Dr. Duggar lived long enough for the people to understand some of the bearings of his work; but the central core of it is still beyond them—or at least beyond the NEW YORK TIMES, leader though it may be.

—EDGAR ANDERSON.



LATE OCTOBER FLOWERS IN MISSOURI

JULIAN STEYERMARK

THE latter half of October in Missouri is still a time for wild flowers. Not only do certain flowers normally blooming in the spring, such as False Garlic, Violet Wood Sorrel, and Birdfoot-Violet, put forth blossoms a second time, but the last shrub of the season, the Eastern Witch Hazel, is in full flower. The asters, golden-rods, and gentians cover the land with white, purple, blue, and yellow; and some Love-grasses (*Eragrostis*) and Hairgrass (*Muhlenbergia capillaris*) form rosy patches over the fields and rocky slopes. Altogether, one may find in bloom during the latter part of October as many as 196 different kinds of wild flowers in different sections of the state.

Over the hills, fields, and glades, members of many families, in addition to the well-represented Grass family, are conspicuous. Most outstanding, perhaps, are plants of the Sunflower family (*Compositae*), with its numerous asters, goldenrods, sunflowers and coneflowers, but also the Gentians (*Gentianaceae*) and Spurges (*Euphorbiaceae*) are well represented. Even members of the Mustard family (*Cruciferae*), Orchid family (*Orchidaceae*), Mallow family (*Malvaceae*), Violet family (*Violaceae*), Morning-glory family (*Convolvulaceae*), Pea family (*Leguminosae*), and several others, including the late-flowering members of the Lily family such as False Garlic (*Nothoscordum*) and Wild Onion (*Allium stellatum*), are to be found in late October.

While the species included in the following list represent the majority of those likely to be found in any year in Missouri during the latter half of October, others could be added that are stragglers of earlier-blooming species, and in some exceptional years it is possible to add still others.

- Pondweed (*Potamogeton illinoensis*)
- Love-grass (*Eragrostis spectabilis*)
- Tall Red-top (*Triodia flava*, *T. elongata*, *T. stricta*)
- Drop-seed (*Sporobolus neglectus*, *S. canovirens*, *S. asper*)
- Northern Drop-seed (*Sporobolus heterolepis*)
- Poverty-Grass (*Sporobolus vaginiflorus*)
- Thingrass (*Agrostis perennans* v. *aestivalis*)
- Nimble Will (*Muhlenbergia Schreberi*)
- Muhly Grass (*Muhlenbergia sobolifera*, *M. tenuiflora*, *M. cuspidata*, *M. mexicana*, *M. brachyphylla*, *M. frondosa*, *M. racemosa*)
- Hairgrass (*M. capillaris*)
- Triple-awned Grass (*Aristida oligantha*, *A. purpurascens*)
- Poverty-Grass (*Aristida dichotoma*, *A. longispica*)
- Beardgrass (*Andropogon Gerardi*)
- Bluestem (*A. scoparius*)
- Broom-sedge (*A. virginicus*, *A. Elliottii*)
- Indian Grass (*Sorghastrum nutans*)
- Yellow Nut-grass (*Cyperus esculentus*)
- Dayflower (*Commelina diffusa*)
- Wild Onion (*Allium stellatum*)
- False Garlic (*Nothoscordum bivalve*)
- Nodding Pogonia (*Triphora trianthophora*)
- Ladies'-tresses (*Spiranthes cernua*)
- Nettle (*Urtica procera*)
- Yellow Cress (*Rorippa sinuata*, *R. sessiliflora*, *R. islandica* v. *bispida*)
- Creeping Yellow Cress (*R. sylvestris*)
- Watercress (*Nasturtium officinale*)
- Alumroot (*Heuchera puberula*)
- Grass-of-Parnassus (*Parnassia grandifolia*)
- Eastern Witch-hazel (*Hamamelis virginiana*)
- Partridge-Pea (*Cassia fasciculata*, *C. nictitans*)
- Red Clover (*Trifolium pratense*)
- White Clover (*Trifolium repens*)
- Tick-trefoil (*Desmodium ciliare*, *D. marilandicum*, *D. paniculatum*, *D. perplexum*, *D. sessilifolium*)
- Bush-clover (*Lespedeza virginica*)
- Yellow Flax (*Linum sulcatum*)
- Yellow Wood-Sorrel (*Oxalis europaea*, *O. stricta*)



Blanche Ames del

Ladies' Tresses

- Violet Wood-Sorrel (*O. violacea*)
 Croton (*Croton glandulosus* v. *septentrionalis*,
C. capitatus, *C. monanthogynus*)
 Three-seeded Mercury (*Acalypha gracilens* v.
monococca, *A. rhomboidea*, *A. virginica*)
 Nettle-leaved Tragia (*Tragia urticifolia*)
 Painted-leaf (*Euphorbia heterophylla*)
 Spurge (*Euphorbia dentata*)
 Milk-purslane (*Euphorbia supina*)
 Creeping Spurge (*Euphorbia serpens*)
 Yellow False Mallow (*Sphaeralcea angusta*)
 Prickly Mallow (*Sida spinosa*)
 Rose-Mallow (*Hibiscus lasiocarpus*)
 St. Andrew's Cross (*Ascyrum hypericoides*)
 St. John's-wort (*Hypericum mutilum*, *H. gym-*
natum, *H. Drummondii*)
 Pansy-Violet or Birdfoot-Violet (*Viola pedata*)
 Common Blue Violet (*Viola papilionacea*)
 Water-purslane (*Ludwigia palustris* v. *ameri-*
cana)
 Evening-Primrose (*Oenothera biennis* v. *pycno-*
carpa)
 Gaura (*Gaura biennis*)
 Queen Anne's-lace (*Daucus Carota*)
 Stiff Gentian (*Gentiana quinquefolia* v. *occi-*
dentalis)
 Downy Gentian (*Gentiana puberula*)
 Closed Gentian (*Gentiana Andrewsii*, *G. clausa*)
 Yellowish Gentian (*Gentiana flavida*)
 Morning-glory (*Ipomoea lacunosa*)
 Love-vine (*Cuscuta Polygonorum*, *C. Cepbalan-*
thi, *C. campestris*, *C. Gronovii*, *C. glomerata*,
C. compacta)
 Fall-Phlox (*Phlox paniculata*)
 Heliotrope (*Heliotropium tenellum*)
 Turn-sole (*Heliotropium indicum*)
 False Pennyroyal (*Ianthus brachiatus*)
 Bluecurls (*Trichostema dichotomum*)
 Selfheal (*Prunella vulgaris* v. *lanceolata*)
 False Dragonhead (*Physostegia virginiana*)
 Dittany (*Cunila origanoides*)
 Ground-cherry (*Physalis pubescens*, *P. sub-*
glabrata)
 Jimsonweed (*Datura Stramonium*)
 Conoclea multifida
 False Pimpernel (*Lindernia dubia*)
 Gerardia (*Gerardia tenuifolia*, *G. Gattingeri*)
 Lousewort (*Pedicularis lanceolata*)
 Ruellia (*Ruellia humilis*)
 Buttonweed (*Diodia teres*)
 Houstonia (*Houstonia nigricans*)
 Hedyotis (*Hedyotis Boscii*)
 Bur-Cucumber (*Sicyos angulatus*)
 Tall Bellflower (*Campanula americana*)
 Ironweed (*Vernonia crinita*)
 Elephant's-foot (*Elephantopus carolinianus*)
 Brickellia (*Brickellia grandiflora*)
 False Boneset (*Kuhnia eupatorioides* v. *angusti-*
folia)
 Gumweed (*Grindelia lanceolata*)
 Broom-Snakeroot (*Gutierrezia dracunculoides*)
 Golden Aster (*Chrysopsis camporum*)
 Blue-stem Goldenrod (*Solidago caesia*)
 Goldenrod (*S. altissima*, *S. arguta*, *S. Buckleyi*,
S. Drummondii, *S. flexicaulis*, *S. Gattingeri*,
S. graminifolia, *S. gymnospermoides*, *S. bis-*
pida, *S. nemoralis*, *S. patula*, *S. petiolaris* and
v. *Wardii*, *S. radula*, *S. rugosa*, *S. speciosa* v.
angustata, *S. ulmifolia*)
 Aster (*Aster anomalus*, *A. azureus*, *A. cordi-*
folius, *A. ericoides*, *A. laevis*, *A. lateriflorus*,
A. linariifolius, *A. novae-angliae*, *A. oblongi-*
folius, *A. patens*, *A. pilosus* and v. *demotus*,
A. praealtus, *A. puniceus* v. *firmus* f. *lucidu-*
lus, *A. sagittifolius* and v. *Drummondii*, *A.*
sericeus, *A. simplex*, *A. turbinellus*, *A. vi-*
mineus v. *subdumosus*)
 Everlasting (*Gnaphalium obtusifolium*)
 Ragweed (*Ambrosia bidentata*)
 Cocklebur (*Xanthium pensylvanicum*, *X. chi-*
nense)
 Leafcup (*Polymnia canadensis*)
 Rosinweed (*Silphium integrifolium*)
 Cup-plant (*S. perfoliatum*)
 Prairie-Dock (*S. terebinthinaceum*)
 Yerba-de-Togo (*Eclipta alba*)
 Coneflower (*Rudbeckia missouriensis*, *R. tri-*
loba, *R. umbrosa*)
 Sunflower (*Helianthus grosseserratus*, *H. bir-*
sutus, *H. Maximiliani*, *H. tuberosus*)
 Crown-beard (*Verbesina virginica*)
 Stick-tight (*Bidens cernua*, *B. connata*, *B. dis-*
coidea)
 Galinsoga (*Galinsoga ciliata*, *G. parviflora*)
 Palafoxia (*Palafoxia callosa*)
 Sneezeweed (*Helenium autumnale*, *H. nudi-*
florum, *H. tenuifolium*)
 Fetid Marigold (*Dyssodia papposa*)
 Western Mugwort (*Artemisia ludoviciana* v.
mexicana, *A. ludoviciana* v. *gnaphalodes*)
 Fireweed (*Erechtides hieracifolia* v. *intermedia*)
 Thistle (*Cirsium altissimum*)
 Chicory (*Cichorium Intybus*)
 Dandelion (*Taraxacum erythrospermum*, *T. of-*
ficinale)
 Wild Lettuce (*Lactuca floridana*)
 False Dandelion (*Pyrrophappus carolinianus*)
 Rattlesnake-root (*Prenanthes altissima* v. *cin-*
namomea)
 Hawkweed (*Hieracium Gronovii*)

In this group are found 18 kinds of aster, 17 of goldenrod, four of sunflower, five of tick-trefoil, six of love-vine, and five of gentian, and at least 29 different kinds of grasses. Of the late-flowering grasses, the most conspicuous ones are Muhly Grass, Triple-awn Grass, Drop-seed, and Broomsedge or Bluestem.

ROSE OF BRODY: AN OUTSTANDING NEW DAFFODIL

EDGAR ANDERSON

WHETHER you like to call them "pink" or not, the new varieties of daffodils like *Narcissus* MRS. R. O. BACKHOUSE in coloring are a great addition to the spring flower border. Pink really isn't the word, nor could any one word be found. Part of their charm is that all of them open one shade and then slowly change to another. Sometimes they are almost the color of a muskmelon, sometimes an off-white with a faint wash of ecru, a sort of fading grayish pink. Their color varies with the season and with the part of the world where they are being grown. In all of them which I have seen, the yellow or apricot tone is strongest when they open, and the pink (if we may call it that) gets noticeably stronger as the yellow fades away. Their greatest beauty is shown when three flowers which opened on three successive days are in bloom side-by-side producing a whole series of subtle shadings.

For all their charm of color, few of these pink daffodils are really pleasing in form. The first varieties to appear were raggedy by show standards, and most of the newer hybrids have the same set of faults—floppy narrow petals, an irregular pinched look in the trumpet, a sort of general air of a beautiful flower made of wax which had softened a little and lost its perfection of line. With ROSE OF BRODY all this is changed. It would be a good variety even if it were not pink. The flower is large, the perianth segments

are wide, the cup of the trumpet is flaring and beautifully formed. One only wishes that there would be cool, wet weather *every* spring to keep the clear lovely tint on the inside of the cup to its full perfection. The trumpet is wide enough to see into. Looking straight down into it is like looking into an exquisite vase of milk-white glass, delicately colored on the inside and deepening in tone toward the base.

ROSE OF BRODY is a new introduction and I suppose a horribly expensive variety in this year's catalogues. Fortunately, my bulbs were given to me by a fellow *Narcissus* fancier. I am happy to report that with me, at least, the variety is a "good do-er". It grows readily and increases well. The price should come down in a few years' time.



ROSE OF BRODY

THE MISSOURI BOTANICAL GARDEN HERBARIUM

JOHN D. DWYER

WHEN we read about explorers ascending the snow-studded peaks of the Himalayas or descending to the floor of the dark and voiceless ocean, we are often tricked into forgetting about the serious objectives of most scientific expeditions, so vivid are the word-pictures of the author. If there is a botanist in the expedition, he will be studying the plant life, perhaps picking the snow-clad aconite from a mountain slope, or snatching the gelatinous seaweed from the ocean. These he will carefully press and dry. The author describing the adventure, no doubt, will refer to the hardships involved in the collection and the importance of the plants, but usually he will give little information as to the destiny of the material being gathered.

For an answer to the fate of such materials collected we find ourselves in the Administration Building of the Missouri Botanical Garden. A faint odor of paradichlorobenzene, so commonly used as an insect repellent in clothes closets, may serve as the first clue to the fact that this building is a treasure house of preserved botanical material; in fact it houses one of the largest collections in the United States, and, for that matter, one of the largest in the world. In addition it contains the library and the offices of many staff members and personnel. It is to such places as this in botanical institutions all over the world that most plant specimens, whether collected on mountain, in tropical rain forest, on

Arctic tundra, or in a waste-lot in the railroad yards of St. Louis, are ultimately traceable.

If we take the elevator to the second and third floors where the plant collections are stored, the odor of paradichlorobenzene becomes stronger. Yet no specimens may be in sight! Steel cabinets about 7 feet high, arranged in rows, occupy much of the floor space. Upon opening one of the cabinet doors we are confronted with shelves of manila folders each bearing a scientific name. If we examine a sheet of paper (slightly smaller than a folded newspaper) in the folder marked, for instance, *Aconitum* (a plant of the Buttercup family commonly called Monkshood), we may find the preserved plant which once flourished in the melting montane snows. On the label in the corner of the sheet will be the details of the collection: the scientific name of the plant, the habitat in which the plant grew, the collector's name, etc.

When the botanist on the alpine slope carefully placed his living specimen between blotters to be pressed and dried, his reasons for collecting it may have been several. Perhaps, as a specialist on the aconites he sought additional material for study in the preparation of a monograph (descriptions of the species which make up a plant group and their arrangement according to relationships). Perhaps, on the other hand, he wished to furnish the biochemist in distant New

Jersey, studying the powerful alkaloids from the roots of the aconite, with the name of the particular species which is so fruitful in its yield of the drug. Perhaps he felt the urge to add another species to the ever-expanding horizon of the biological world.

Wandering through the maze of cabinets we conclude that there must be a great number of specimens in the herbarium (a collection of dried and preserved plant specimens arranged in an orderly fashion for scientific study). In the Missouri Botanical Garden Herbarium there are approximately one and one-half million specimens. These are grouped, with other specimens to which they are obviously closely related, into distinct plant families (e. g. the Rose family, the Orchid family) which are filed in the cabinets in systematic order ranging from the simplest to the most complex plant forms. A plant brought into the herbarium for identification is first classified into its family by the use of reference works, then compared with the specimens in that family for determination of its generic and specific name. Success in using this method is, of course, dependent upon the degree to which the herbarium is representative of all plant species.

The early history of the herbarium in Shaw's Garden helps to explain the magnitude of the collections. In examining numerous sheets from various cabinets, for example, we may note the label "Bernhardi Herbarium" stamped thereon. In 1857 Dr. Engelmann, the eminent botanist and first curator of the herbarium, was commissioned by

Mr. Shaw to purchase dried specimens from the equally distinguished botanist, Prof. John J. Bernhardt of Erfurt, Germany. Bernhardt had amassed a large herbarium by exchange or by purchase of plants from botanists and collectors active in most areas of the world. In bringing many of the Bernhardt specimens to St. Louis, as well as in purchasing books to establish a library, Dr. Engelmann laid the foundations for the then-infant Missouri Botanical Garden as a center of research in systematic botany and related fields.

Dr. Engelmann in his lifetime amassed a private herbarium of over 100,000 specimens. These included important collections made by numerous botanists from 1838 to 1880, principally in many sections of the United States then virtually unknown from a floristic viewpoint. In 1889 Dr. Engelmann's son presented this priceless collection to the herbarium of Shaw's Garden.

Obviously, such a large herbarium demands expert care and constant attention. Dr. George B. Van Schaack, Acting Curator of the Herbarium, in addition to his curatorial duties, must provide for the handling and filing of new accessions of specimens. Special attention must be given to type specimens or plants on which the authors of new species or varieties based their descriptions. These specimens, in special folders identifiable by a conspicuous red edging, are an important source of reference for botanists attempting to interpret the original description and concept of the species. To offset the lack of many type speci-

mens a large collection of photographs of types found in other herbaria is maintained.

The value of an herbarium is to be estimated not only by the numbers of specimens on deposit but also by the use being made of them. Perhaps your first clue to the activity of the Garden in this respect would be the large packages frequently seen at the front entrance of the Administration Building, addressed to herbaria in Europe, England, China, or perhaps to a little-known college in Pennsylvania. For dried specimens are sent on loan to scientific institutions throughout the World, including those behind the Iron Curtain. In the herbarium itself, botanists from all parts of the United States and occasionally from abroad, avail themselves of the opportunity to study the priceless collections. Frequently their visits extend over periods of weeks or months.

In the herbarium and adjacent offices staff members and graduate students from Washington University are at work on problems involving the nomenclature, classification, and evolution of plant groups. Dr. Robert Woodson, Senior Taxonomist, an authority on the Milkweed family, and Dr. Rolla Tryon, Associate Curator, a specialist on ferns, are among the well-known staff members. Their training of graduate students serves to perpetuate the heritage of a science which is absolutely essential to botanical and scientific progress. Many prominent American taxonomists received their early training at the Missouri Botanical Garden and Washington Univer-

sity. Through the pages of *THE ANNALS OF THE MISSOURI BOTANICAL GARDEN* and similar journals, as well as by teaching and lecturing, they have advanced the knowledge of plant systematics. There is scarcely a university or botanical garden that has not felt the impact of the botanical work of Shaw's Garden.

Of great importance to the herbarium is the large collection of living species maintained at Shaw's Garden and at Gray Summit. A student, armed with the knowledge of the morphology of a species gained from a study of herbarium material, is in far better position to appreciate the dynamics of development as well as the range of variability of plants in the living state. Some features important to identification of the species are often difficult to study or are not retained by the dried material and are thus best observed in the living plant. Then, too, in the modern concept of the plant species, in which it is interpreted and defined in terms of a community of living and interbreeding plants, greater emphasis is being placed on the detailed study of many living plants from a large experimental population rather than of dried specimens collected at random.

This newer approach to the definition of the species in no sense lessens the value of the herbarium for it represents the historical record of the world population of plants, and the student of the plant community will continue to add specimens to it as evidence of the observations made in the field or in the experimental garden.

The herbarium, in serving all of the plant sciences, plays an integral role in the progress of science inasmuch as the problems of botany are a segment of the maze of problems in science today. Not only is it the tool of the taxonomist in solving the intricate problems of nomenclature, classification, and evolution of plants, but it also serves other botanists, horticulturists, and gardeners who must fall back upon the taxonomist and his herbarium for the specific names of plants. In the vast scheme of scientific advancement, the herbarium plays an important part, even though its role may not be fully appreciated.

If we pause for a moment before leaving the herbarium, perhaps we can sense the drama hidden in the neat piles of herbarium sheets. While lifeless and usually drab in comparison with the living, these plants represent the labors of countless workers and collectors for more than 200 years. It is difficult to imagine that one specimen may have been collected in the shadow of an Indian tomahawk, or another snatched by a quivering hand from a rock precipice in the Andes, or another from the icy rocks of Greenland. It was the enthusiasm of such workers that filled these cases.



BOOK REVIEW:—

Tree and Shrubs of the Upper Midwest. By C. O. Rosendahl. 411 pp., 260 figs. University of Minnesota Press, Minneapolis. 1955. Price \$6.00.

THE woody plants, because of the economic importance of the group, have always received their full share of attention by botanical authors. The present treatment will be welcomed for it not only provides adequate means for identification but also notes on the distribution, hardiness and habitat preferences of the species. The inclusion of the commonly cultivated, as well as the native species, gives it a greater scope than the usual book of its kind and will make it an especially

useful reference for problems in landscaping.

There are keys and descriptions for each of the some 350 species and excellent illustrations for most of them. The technical terminology has been simplified and there is a glossary of the necessary terms. Most of those that apply to the leaves are illustrated. Any person interested in plants will certainly have no difficulty in using the book.

This is an enlarged and revised edition of the long out-of-print "Trees and Shrubs of Minnesota," and the University of Minnesota Press is to be congratulated on this continuation of their fine series of publications in Natural History.

—A. F. T.

KOREAN LESPEDEZA: OZARK GOLD

FEW people outside the field of agriculture are familiar or interested in Lespedeza. This weedy little plant is practically unknown to urbanites. Although this plant never ventures far enough into the city to become a troublesome weed nor produces flowers large enough to be of horticultural significance, most city dwellers at one time or another have surely seen it, because it grows in great profusion along many highways and roadways of middle America.

Seven out of ten persons in St. Louis, by actual survey, have never heard the name Lespedeza. Two out of ten know it as a plant, and only one person out of ten, all farmers or farm-ophiles, knows anything more than its name. In spite of its obscurity, this legume has been one of the major factors in the advancement of agriculture in this section of the United States.

Perhaps one of the reasons why Korean Lespedeza is so little known is because of its ugly and ordinary appearance after it is frosted. Not even the most enthusiastic naturalist could claim that it is beautiful in the winter landscape. Early in the autumn most of the leaves drop off, the few remaining turn a gray-brown and shrivel up, and the slender stems lose most of their color. There are so many stems, set so close together, that they give the general impression of old worn scrubbing brushes, scattered bristle-like throughout the fields and along the roadsides.

Credit for its introduction from Korea is given to the United States Department of Agriculture. It was introduced into the southern states in 1919, and gradually spread northward until today it is found in the southern part of Canada. Its natural and artificial spreading ability can be readily shown by its acreage figure; 349,000 acres being planted in 1929, as compared to 7,000,000 acres in 1946.

Since the original introduction of Korean Lespedeza, new varieties have been bred and imported. Plant breeders have extended the climatic range and soil tolerance to the extent that today it is seen in many locations where other forage and hay crops refuse to grow. Being an excellent crop in a half dozen ways, there is nothing spectacular about the spread of Korean Lespedeza.

Unlike Alfalfa, its lush but demanding cousin, Lespedeza does not require rich alluvial soil. Barren hillsides support Lespedeza; but of course it grows better on richer soil. On poor soils it also serves as a good erosion checker. Highway departments have seeded road cuts with this short stubby legume in order to prevent washing.

As a hay crop, Lespedeza ranks quite close in many ways to Alfalfa. In protein content it is superior. For this reason many farmers prefer it to Alfalfa. Many farmers also say that its keeping quality is much better than Alfalfa. It is valuable for increasing the available nitrogen of the soil

through solid crop rotation procedures, and frequently as a green manure crop it is plowed under in the field. Usually only one hay crop is taken each year. The field is then allowed to grow and produce seeds again. In this fashion the plant reseeds itself and only sparse plantings will be required the following year.

In the northern Ozarks, where Korean *Lespedeza* is seldom planted as a clean crop, it nearly always has a patchy appearance. It will show up in late fall pastures as little bristly bunches of red-brown or gray-brown stems, from three inches to a foot or more high. One of the easiest places to learn to recognize it is along the side of new highways where little else will grow. In such places it may line the roads for hundreds of feet, or even for several miles—in summer a mat of dark green rather cloverish leaves; in winter, dark red-brown masses of bare stems. For long stretches these masses may be only a few inches wide next to the pavement edge, broadening out to several feet when the road goes through more of a cut where the red soil is exposed.

In many places these little patches of *Lespedeza* persist in practically the same spots year after year. If one examines them in early spring, he will find that many of the seeds have sprouted in the shade of the mother plants. They grow slowly for some weeks and not until summer is really here do they grow up above the shelter of the old, dead skeletons of last year's plants. The form and size of Korean *Lespedeza* are tremendously affected by

the place in which it grows. On poor soils and in dry situations it may be only two or three inches high. Single plants sometimes come up here and there on the gravel bars of Ozark rivers. When one of these is absolutely isolated from all other plants it may grow out side-wise instead of upwards and form a flattish little mat a foot or so wide, but less than an inch high.

A plant which is adding tons of available protein to the sterile hillsides of the Ozarks is worth examining more closely. Let us take one of these frayed-out branch ends and put it under the microscope, or look at it with a hand-lens. Seen in this way it has its own charm of line, if not of color, and one can find some pleasure in working out the ultimate pattern in which these simple seed pods are set upon the plant.

As the tip of the stem is approached the internodes get progressively shorter in an harmoniously rhythmic sequence. Along one side of each node, just below the next joint, is a tiny comb of curved hairs, one of the easiest characters by which to distinguish the Korean *Lespedeza* from its close relative, the Japanese *Lespedeza*. At each joint are two tiny leaves or bracts, which weather to whitish gray by late winter. Rising from beneath the bracts are the delicately formed stalks on which the seed-pods are borne, one stalk to each pod with usually two such stalks at each joint. The seed-pod is a delicate little urn a little larger than the head of an ordinary pin, made up of two tightly clasping halves which can be forced apart to

reveal the small shiny brown seed within.

If one pulls up a few of these plants and examines them carefully they take on a little more interest if not much added charm. The tiny hard stems are about the size and texture of stiff broom straws. Near their tips they

feather out into bunches of gray, dry bracts among which many of the seed-pods remain all winter. It is these tiny seed-pods, each with its pin-point pill of protein, which make the *Lespedeza* so important to game birds and other wild life.—(From a report prepared by Dr. Anderson's class in field botany.)



BOOK REVIEWS:—

Cactus Guide. By Ladislaus Cutak. 144 pp., 18 pp. illustrations. Van Nostrand Co. Princeton, N. J. Price \$3.95.

TO Lad Cutak cacti are the most beautiful and the most fascinating flowers on earth, and the remarkable thing about his *Cactus Guide* is that he is able to impart that feeling to the reader. After laying down his book one is left with the wonder that every gardener does not grow cactus. In the greenhouses at the Missouri Botanical Garden, where Lad has worked since he was a young boy, he was exposed to many rare and beautiful plants but he chose the cactus as his love and the object of his enthusiastic attentions. Their variety, their beauty, their grotesqueness fascinated him, and what's more they were "the easiest of all house plants to grow."

The book is written for the amateur, and when a technical word has to be used, Cutak defines it clearly or illustrates it with a drawing. The draw-

ings, for which he has a special aptitude, are often more expressive than a lot of words would have been. He includes a whole chapter to tell you what a cactus is and another on varieties. The care and propagating of cacti are made simple provided that you have digested the first part of the book, and know what kind of cactus you have. In the chapter on uses of cacti we learn that they are nearly as various as the plants themselves. They make wonderful glass gardens ("desertariums") when planted in Wardian cases; they are good in dish gardens, or in pots or novelty containers on windowsills; and they may even be planted on buttons. In flower arrangements they are quite effective, leaves of aloes or sansevierias being used as a background and the rosettes of hen-and-chickens or mamillarias for focal points. Planted outdoors, they are very much at home in rock gardens or against a wall in a sunny location.

For the cactus enthusiast who would like to associate himself with a group, a list of cactus societies or clubs, with

their locations, is given at the end of the book.

Lad tells us that when his enthusiasm began to get the better of him there weren't too many cactus books written in English, and he had to diligently make his own observations. "It was difficult to cram into a short book everything that he had learned," he says, but the reader feels that he has made a very good job if it.

—NELL C. HORNER

ABC of Orchid Growing. By John V. Watkins. 190 pp., 45 pls., 4 figs., 2 tables, 1 color pl. Prentice-Hall, Inc., Englewood Cliffs, N. J. \$3.50.

A VERY handy little book, chock full of valuable information! Particularly useful is the "Orchid Growers' Reference Table" printed on the end-sheets. This charts, in easy-to-read form, bloom time, when to pot, potting medium, minimum temperatures, amount of light, and when to fertilize twenty-five popular kinds of orchids. The author obviously has had immense personal experience with orchids, and, in addition, has drawn on the experience of many famous growers in preparing his text. A large number of black-and-white plates illustrate the book. Mr. Watkins is not ready to admit that orchid growing is easy to accomplish in the home, without

greenhouse conditions. In his preface he says: "There has been a tendency for some writers to oversimplify orchid growing. Could these spinners of glamour tales be folks who never grew a greenhouse full of orchids through the years single-handed? This is now, and always has been, a time-consuming, painstaking pursuit—one chosen by thousands as a rewarding hobby."

Despite this insistence that growing orchids is difficult, the author then plunges into a text which is worded so that even the rawest beginner can grasp what is said, and he then proceeds to prove to his readers how very easy it really is to grow most orchids.

This is a book for everyone interested in orchids. The beginner will find in it answers to the most elementary of questions. The advanced hobbyist will find gathered here information long sought after, but seldom found in such understandable form. Even the experienced grower will want to pick up the book again and again, to reread some of the more technical passages, which reflect a great perception of the many problems involved in managing a large greenhouse.

Though you may have numerous books in your orchid library, this one is distinctly worth while adding.

—W. F. SCOTT



PLANTS FOR A HOT PLACE NEAR A WALL

ROBERT FROST began one of his best known poems with the line "Something there is that doesn't love a wall" and I frequently think of it as I struggle with the small portion of my garden which is located between the stone house in which I live and the high stone boundary wall twenty feet away. During the morning there is little shade, the sun pours in and it is always blistering hot by noon in summer time, then all the afternoon it is sunless. Anything which does really well there is going to have to relish heat. So far the only things which have been really happy under these conditions are Lantana (in various colors), Vetiver Perfume Grass, old-fashioned small-flowered cannas, Snow-on-the-Mountain and Beefsteak Plant

(Perilla). These last two are coarse, almost weedy, annuals but the one is a gray-green and white, the other a dark red and a green which is almost black. Grown next to each other they form a beautiful contrast; neither is too strong a neighbor, and in combination they look almost elegant. Vetiver Grass is not hardy here, and one has to buy roots of it somewhere in the south. However, it travels easily in the mail, grows rapidly as soon as the hot weather begins, and gets up to eight to ten feet if planted in a sheltered sunny nook. The white crinkled roots have a delightful fragrance and when washed and dried can be used like lavender in scenting linen closets or in making sachets.

—E. A.

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Carr, R. E., *Stepping Stones to Japanese Floral Art*. Well illustrated.

Chidamian, Claude, *Bonsai*. The art of dwarfing trees and other plants. Very fascinating.

Cutak, Ladislaus, *Cactus Guide*. Written by one of our staff members. Many drawings.

Dustan, Alice, *Landscaping Your Own Home*. Photographs, drawings, plans, and plant lists.

Jenkins, D. and H. Van Pelt Wilson, *House Plants for Every Window*.

Li, H. L., *Chinese Flower Arrangement*. Every flower arranger should own this book.

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SOME FACTS ABOUT SHAW'S GARDEN

The Missouri Botanical Garden (the official name chosen by Mr. Shaw) carries on the garden established by Henry Shaw over a century ago at TOWER GROVE, his country home. It is a private institution and has no support from city or state. The old stone walls and cast-iron fences, the Linnaean House, the Museum, the Mausoleum, and the TOWER GROVE mansion all date from Mr. Shaw's time. Since his death, as directed in his will, the Garden has been in the hands of a Board of Trustees who appoint the Director.

The Garden is open every day in the year (except New Year's and Christmas) from nine A. M. until seven P. M. (spring to fall) and until six (in the winter time) though the green-houses close at five. TOWER GROVE, itself, Mr. Shaw's old country home, is open from one until four, admission twenty-five cents, with special guides. The Garden is nearly a mile long and has several entrances. The Main Entrance, the one most used by the general public, is at Tower Grove and Flora Place on the Sarah bus line (No. 42). The Park Southhampton buses (No. 80), direct from downtown, pass within three blocks of this entrance and stop directly across the street from the Administration Building at 2315 Tower Grove Avenue. The latter is the best entrance for students, visiting scientists, etc. It is open to such visitors after 8:30 A. M., but is closed on Saturdays, Sundays, and holidays. The step-in gate (more or less concealed by the big Cleveland Ave. gate, 2221 Tower Grove) is nearly always open, and there is a service entrance on Alfred Avenue, one block south of Shaw Avenue.

Since Mr. Shaw's time an Arboretum has been developed at Gray Summit, Mo., adjacent to State Highways 50 and 66. It is open every day in the year and has two miles of auto roads as well as foot trails through the wild-flower reservation. There is a pinetum and an extensive display of daffodils and other narcissi from March to early May.